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EXAMINER				
SMITH, FRANCIS P				
ART UNIT		PAPER NUMBER		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

Office Action Summary

Application No.

10/798,712

Applicant(s)

HEUSER ET AL.

Examiner

Francis P. Smith

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 6, 7, 10-15 and 17-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6, 7, 10-15 and 17-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SF/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments as per the amended claims filed November 7, 2008 have been fully considered but they are not persuasive.

Claims 1, 14, and 27 are amended. Amendment to claim 27 overcomes the claim objection of the previous office action. Claims 4-5, 8-9, and 16 are withdrawn from consideration. Claims 1-3, 6-7, 10-15, and 17-23 are currently pending and examined on the merits.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Huang (US 2003/0194859 A1).

Huang teaches a method for fabricating a contact plug comprising:

forming a first ceramic barrier layer on a substrate, wherein the first ceramic barrier layer has a first surface and a second surface and the first surface is closer to the substrate than the second surface[0027]- [0028];

Modifying at least a portion of the second surface of the first ceramic barrier layer to introduce first nucleation sites on the second surface [0028]; and

forming a second ceramic barrier layer directly on the second surface of the first ceramic barrier layer (inherently) without continuing all defects of the first ceramic barrier layer, wherein the second ceramic barrier layer is initiated at the first nucleation sites [0030]-[0031].

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 1-3, 6, 7, 10-15, and 17-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graff et al (US 2003/0203210 A1) in view of Huang (US 2003/0194859 A1).

Graff teaches barrier coatings and methods of making the same. Specifically, for claim 1, Graff teaches depositing three plies of aluminum oxide onto the substrate, followed by a plasma treatment (i.e. forming a first ceramic barrier layer on a substrate, wherein the first ceramic barrier layer has a first surface and a second surface and the first surface is closer to the substrate than the second surface; forming a second

ceramic barrier layer directly on the second surface of the first ceramic barrier layer) [0088]. A portion of the second surface of the first ceramic barrier layer is modified to introduce first nucleation sites on the second surface [0073]. Graff, however, does not expressly state forming a second ceramic barrier layer directly on the second surface of the first ceramic barrier layer without continuing all defects of the first ceramic barrier layer, as per the claim amendment.

Huang teaches a method of fabricating a contact plug. Specifically, Huang teaches depositing a first and second metal nitride layers and includes a plasma treatment of each layer in order to remove impurities and to achieve a desired film thickness (e.g. forming a second ceramic barrier layer directly on the second surface of the first ceramic barrier layer without continuing all defects of the first ceramic barrier layer, wherein the second ceramic barrier layer is initiated at the first nucleation sites) ([0028]-[0031]). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to adapt the plasma treating method (e.g. introducing nucleation sites) as taught by Huang to Graff's individual ceramic barrier plies in order to remove impurities and to achieve a desired barrier layer film thickness.

For claims 2 and 3, Graff teaches chemical modification by the use of a plasma treatment ([0065], [0073], and [0088]).

For claims 6, 7, 10, and 11, Graff teaches multi-ply barrier layers that may comprise metal nitrides and metal oxides such as titanium oxide and tantalum oxide, (i.e. applying material with a critical nucleus of one molecule) [0043]. Furthermore, as multiple plies are deposited, the very first trace of the metal oxide or nitride hitting the

surface of the ceramic barrier layer would inherently form a nucleation promoting material on at least a portion of a previously deposited ceramic layer.

Regarding claims 12-15 and 17, Graff teaches forming first and second ceramic barrier layers comprising aluminum oxide and silicon nitride, and may be deposited by chemical vapor deposition ([0043], [0071]).

As per claim 18, Graff discloses the use of a flexible transparent substrate [0040].

Regarding claim 19, Graff teaches modifying at least a portion of the second surface to introduce second nucleation sites on the second surface of the second ceramic barrier layer; and forming a third ceramic barrier layer on the second ceramic barrier layer, wherein the third ceramic barrier layer is inherently initiated at the second nucleation sites ([0023]—[0024]).

For claims 20-23, Graff teaches the barrier layers (i.e. first and second ceramic barrier layers) may have a thickness ranging from 50-500 angstrom (i.e. 5-50 nm and within the claimed range) [0021].

Specifically, for claims 24 and 25, Graff teaches forming an environmentally sensitive display device 50 (i.e. OLED) on top isolation layer/ceramic barrier layer 42 by: forming a first electrically conductive layer on the isolation barrier layer 42; forming a functional organic layer 50 on the first electrically conductive layer 52; and forming a second electrically conductive layer 54 on the functional organic layer (see fig. 1b, [0063]). Graff does not explicitly teach forming the organic electrical device on the second ceramic barrier layer; however, it would have been within

the level of ordinary skill in the art at the time of the invention to vary the number of barrier layers on the substrate in order to effectively guard against atmospheric contaminants without hindering the overall size of the device.

As per claim 26, Graff teaches forming an encapsulation 56 over the second electrically conductive layer such that the functional organic layer is sealed from the environment by said encapsulation (see fig. 1b; [0063]).

10. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Graff et al. (US 2003/0203210 A1), as applied to claim 26 above, and further in view of Graff et al. (US 6,522,067 B1).

Graff '210 teaches forming multiple ceramic layers/plies (i.e. third and fourth ceramic barrier layers) wherein at least one layer is plasma treated (i.e. modifying a second surface of a third ceramic barrier layer to introduce second nucleation sites on the surface of the third ceramic barrier layer). Graff '210, however, does not explicitly disclose an encapsulation comprising ceramic barrier layers.

Graff '067 teaches an encapsulated organic light emitting device whereby the barrier stacks 270 and 130 encapsulate the electrically conductive layer/functional organic layer and is comprised of several ceramic barrier layers in order to provide enhanced barrier protection (see fig. 2, col. 3, lines 32-48; col. 4, lines 8-30; col. 5, lines 29-44). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include Graff '067's ceramic barrier containing encapsulation in

Graff '210's method in order to provide enhanced barrier protection.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Francis P. Smith whose telephone number is (571) 270-3717. The examiner can normally be reached on Monday through Thursday 7:00 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mikhail Kornakov can be reached on (571) 272-1303. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/F. P. S./

Examiner, Art Unit 1792

/Michael Kornakov/

Supervisory Patent Examiner, Art Unit 1792